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ought to be recognised. On the contrary, this part of the spiral might exhibit in succession all the orders of change which the retreating group considered above was shown to be capable of showing (on a certain, not improbable, assumption as to its structure).

But my object is not so much to find evidence in favour of a special theory about a certain portion of the sidereal system as to indicate the varieties of appearance which are to be looked for in different parts of that system,—varieties which are, in fact, as likely to be met with (according to my views of the nature of that system) around the poles of the galaxy as in the richest portions of that wonderfully complex zone.

On an early Telescope made by Giuseppe Campani of Rome.

By John Williams, Assistant Secretary.

At the sale of the late Dr. Lee's instruments, a few weeks since, I purchased an Italian telescope, which, appearing to be of considerable interest as an example of an early instrument by a then eminent maker, I trust I may be excused calling the attention of the Meeting for a few minutes to it.

On examination I found it to be one constructed by the celebrated Joseph Campani of Rome, who was considered as the best maker of telescopes of his day. Thus we find Cassini and other eminent Astronomers of that time employing instruments made by Campani in their astronomical researches.

I have been unable to find any satisfactory biographical account of this able artist, and can only ascertain that he flourished about the middle of the seventeenth century.

Weidler, in his *Historia Astronomiæ*, 4to, 1741, speaks very highly of Joseph Campani, and particularly notices his observations of *Saturn* and *Jupiter*, as well as his excellence as a maker of telescopes. As the quotation from Weidler is rather long and is in Latin, I shall content myself with the summary of his statement by Dr. Long, as given in his *Treatise on Astronomy*, 4to, 1785. His words are "About this time also (1641) Joseph Campani at Rome applied himself to the grinding of glasses for long telescopes, which far excelled all others of that time. Through the munificence of Louis XIV. Cassini had some made by this artist of 100 and 200 palms. Campani saw the shadow of *Saturn's* ring upon his body, as also his zones or obscure belts, and detected the shadows of *Jupiter's* satellites in passing over his body. It was with one of Campani's telescopes that Cassini first saw all the satellites of *Saturn*." Weidler adds, "Longiora quidem telescopia Campanus pauca fabricavit, in quibus, pro coloribus arcendis, tria vitra ocularia adhibuisse dicitur; attamen etiam breviora quæ composuit, 15, 20, 30 pedes longa, singulari perfectione prædita erant, ut ceteris similibus antecellerent." Which may be rendered, "Campani also made a few longer telescopes, in which to neutra-

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lise colour, he is said to have applied three glasses in the eye-piece; and the shorter telescopes made by him of 15, 20, and 30 feet in length, were of such extraordinary perfection that they greatly surpassed all others of the same kind." It is also stated that "the Royal Academy (of France) are said to have had excellent telescope glasses of this artist's making which were of 200 and 300 feet focus and magnified four or five hundred times." In the *Speculum Hartwellianum* Admiral Smyth mentions this very instrument as "an old one deserving notice for its respectable age and its tolerable performance."

The telescope to which your attention is now called is one of the shorter ones fabricated by this excellent maker, it being but from 9 to 10 feet in length. The object-glass is 2 inches in diameter, reduced by a diaphragm to $1\frac{1}{2}$ inch, and is $\frac{1}{4}$ inch in thickness, on it is written with a diamond "Giuseppe Campani in Roma," and the glass of which it is composed is of excellent quality. The eye-piece consists of three plano-convex lenses, the glass of which is of equally good quality, that nearest the eye being fixed and the other two reversible. There are inscriptions in Italian relating to these glasses, one of which reads as follows—"Quando questa parte sta dentro al cannello si vede l'oggetto piu chiaro," *i.e.* when this part is placed within the tube the object is seen clearer. The second is in the same words, excepting that "piu grande" occurs instead of "piu chiaro," implying that the power is increased. One of the Fellows of the Society (Mr. Buckingham), who is well acquainted with telescopes, has tested these powers, and estimates the lower one at about 20 and the higher at 25 times. Upon taking this portion of the eye-piece away altogether, the telescope becomes an astronomical one, and is much increased both in power and clearness. There is also on the eye-piece a nearly obliterated inscription evidently relating to its use for astronomical purposes, together with the letters PALI. XII., which appear to refer to the focal length as being 12 Palms. The Roman Palm is about 9 inches. This would give 9 feet as the focal length, which closely approximates to the truth. The case is composed of nine tubes formed of vellum, which are remarkably strong and light, the whole weight being but 2 lbs. 11 ozs. These tubes draw out in a manner similar to that employed in telescopes of the present day. When closed it is about 2 feet in length, but draws out to about 9 feet when in focus. The workmanship of the whole is exceedingly good.

When it came into my hands it had evidently not been drawn out for many years, and I had great difficulty in extending it to its full length. The glasses also were encrusted with the dirt of years, and required careful cleaning.

In the absence of a better test, I turned it on the word "Admiralty" on the opposite side of the quadrangle of this building (Somerset House), and was very favourably impressed with the sharpness of its definition and the flatness of the field. I have since viewed the Moon through it, and, considering the low power,

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was much gratified, and indeed surprised, at the excellence of its performance; the lunar craters appearing, with all the powers, sharp and well defined, and the ragged edge very beautifully shown. The field of view is, however, small, and the instrument rather troublesome to use on account of its length, as, unless very carefully handled and adjusted, the flexure occasioned by the want of suitable support interferes somewhat with its efficiency. With the requisite care, however, it acts very fairly, and I have no doubt, if properly mounted, its performance would be very satisfactory.

Instrument for Sale.

A Transit Instrument, 3½ feet focal length; object-glass, 2¾ inches aperture; brass Y's with agate bearings for fixing on stone piers; 3 eye-pieces; micrometer; level; clamp lamp, &c., but wanting the setting circle. Made expressly for a deceased Fellow of the Astronomical Society. Apply to Mr. Williams, Assistant-Secretary, Somerset House.

ERRATUM.

Page 152, line 7 from the bottom, "needle line" should be needle *hole*.

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